

MULTIMEDIA



UNIVERSITY

STUDENT ID NO

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MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

Trimester 2, 2015/2016

TIS1101 – DATABASE FUNDAMENTALS

(All sections / Groups)

09 MARCH 2016

2.30 pm – 4.30 pm

(2 hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of 6 pages, including the cover page, with FIVE questions only.
2. Attempt **ALL** questions in **PART A** and choose only **ONE** question from **PART B**. All questions carry equal marks and the distribution of the marks for each question is given.
3. Please print all your answers in the answer booklet provided.

PART A: ANSWER ALL QUESTIONS.**Question 1 [10 marks]**

- a) Explain strong and weak relationship. Illustrate how these two types of relationship are represented in an Entity-Relationship Diagram (ERD).

[4 marks]

- b) The followings are the business rules describing the operations of *Sunshine Gardening Enterprise (SGE)*.

- SGE sells tools for gardening where each tool is uniquely identified using a specific code. The name, cost price and selling price (unit price) of the tools are also recorded.
- SGE purchases the tools from its suppliers where every supplier may supply different types of tools. Every tool is supplied by one supplier.
- Customers of SGE must first enroll as its member in order to purchase tools. Each customer is identified by unique member ID. The name, address and phone number of customers are also recorded.
- Invoice records the sales of tools to customers, including the tools and the quantity purchased. The total of each transaction is calculated based on the quantity and unit price of the tools.

Draw an ERD to illustrate the logical model of database for SGE. The ERD must include the identified entities, attributes, relationships (connectivity, cardinality and participation) and constraints (if any).

[6 marks]

Continued...

Question 2 [10 marks]

The following relations contain details about relations in a kindergarten database. The primary keys are underlined and the foreign keys are in italic.

Teacher (Teacher ID, Name, DOB, Address, Contact)
Child (ChildID, Name, DOB, *ParentID*, *ClassID*)
Parent (ParentID, Name, Contact, Address)
Class (ClassID, AgeGroup, *Teacher_ID*)

- a) Assume that tables Teacher, Parent and Class have been created. Write a SQL command to create Child table.
[3 marks]
- b) Write a SQL command to change the name of 'Marina Hassan' to 'Atikah Hassan' in the Child table.
[2 marks]
- c) Write a SQL command to show the number of children for a parent named 'Alice Woon'.
[3 marks]
- d) Write a SQL command to list the name of teachers who are teaching classes of children in age 6.
[2 marks]

Continued...

Question 3 [10 marks]

The table below shows an example of relation that stores students' information at Excel University.

SubjId	SubjTitle	StuID	StuName	LecID	LcName	credHour	SubjFees
TIS110	Database	1004	Mohan	L01	Jane	4	1000
TCP211	Programming	1005	Ali	L02	Cheong	3	750
MC2311	Business	1006	Teo	L03	Jason	3	750
ENG011	English	1004	Mohan	L04	Marilyn	2	500
TIS110	Database	1007	Kahiri	L01	Jane	4	1000

SubjId – subject ID

SubjTitle – subject title

StuID – student ID

StuName – student name

LecID – lecturer ID

LcName – lecturer name

credHour – credit hour

SubjFees – subject fees

- a) Draw a dependency diagram for the above table. The dependency diagram should be in 1NF.

[4 marks]

- b) Based on your solution in Q3(a), normalize the dependency diagram to 2NF. Draw the resulting dependency diagram.

[3 marks]

- c) Based on your solution in Q3(b), normalize the dependency diagram to 3NF. Draw the resulting dependency diagram.

[3 marks]

Continued...

PART B: CHOOSE AND ATTEMPT ONLY ONE QUESTION.**Question 4 [10 marks]**

a) What is logical design of a database?

[3 marks]

b) Suppose that you have been asked to design a database for courier delivery services. During database initial study, what are the **TWO** most important questions that we must carefully probe in order to generate information that will help us in designing the database?

[2 marks]

c) The following shows the PRODUCT table:

ProductID	Name	QOH
P1	Table	2
P2	Pencil	10
P3	Pen	5
P4	Bin	4
P5	Chair	6

Two database transactions (T1 and T2) access the PRODUCT table as follows:

Transaction 1 (T1)	Transaction 2 (T2)
SELECT SUM(QOH) FROM Product;	UPDATE Product SET QOH = QOH + 2 WHERE ProductID = 'P2'
	UPDATE Product SET QOH = QOH - 2 WHERE ProductID = 'P3'

Using the information provided above, show how *inconsistent retrievals* problem occurs when T1 and T2 access the PRODUCT table concurrently in an uncontrolled manner. You will need to draw a table showing the sequence of the transactions and how inconsistent retrievals occur.

[5 marks]

Continued...

Question 5 [10 marks]

- a) Server-side extensions are also known as Web-to-database middleware. Explain server-side extension.

[2 marks]

- b) Compare a data warehouse to the operational database in terms of the following characteristics:

- i. non-volatile
- ii. time-variant

[4 marks]

- c) Based on the EMPLOYEE relation below, perform horizontal fragmentation and draw the fragmented tables.

Table: STUDENT

<u>SNO</u>	SNAME	INCOME	COUNTRY
M01	Michael	150000	SINGAPORE
M02	Rahim	135000	MALAYSIA
M03	Cheong	500100	SINGAPORE
M04	Jack	400000	AUSTRALIA
M05	Mary	650000	FRANCE

[4 marks]

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